

SEQUENCE LISTING

COPY

<110> Lo, Kin-Ming
Sun, Yaping
Gillies, Stephen D.

<120> Expression and Export of Interferon-Alpha Proteins as
Fc Fusion Proteins

<130> LEX-009

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<150> US 60/134,895
<151> 1999-05-19

<160> 29

<170> PatentIn Ver. 2.0

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<212> DNA
<213> Homo sapiens

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<223> Human IFN alpha DNA sequence

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ctc ctg gca caa atg gga aga atc tct cct ttc tcc tgc ctg aag gac 96
Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
20 25 30

aga cat gac ttt gga ttc ccc cag gag ttt gat ggc aac cag ttc 144
Arg His Asp Phe Gly Phe Pro Gln Glu Phe Asp Gly Asn Gln Phe
35 40 45

cag aag gct caa gcc atc cct gtc ctc cat gag atg atc cag cag acc 192
Gln Lys Ala Gln Ala Ile Pro Val Leu His Glu Met Ile Gln Gln Thr
50 55 60

ttc aat ctc ttc agc aca aag gac tca tct gct act tgg gaa cag agc 240
Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Thr Trp Glu Gln Ser
65 70 75 80

ctc cta gaa aaa ttt tcc act gaa ctt aac cag cag ctg aat gac ctg 288
Leu Leu Glu Lys Phe Ser Thr Glu Leu Asn Gln Gln Leu Asn Asp Leu
85 90 95

gaa gcc tgc gtg ata cag gag gtt ggg gtg gaa gag act ccc ctg atg 336

Glu	Ala	Cys	Val	Ile	Gln	Glu	Val	Gly	Val	Glu	Glu	Thr	Pro	Leu	Met	
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aat gtg gac tcc atc ctg gct gtg aag aaa tac ttc caa aga atc act															384	
Asn	Val	Asp	Ser	Ile	Leu	Ala	Val	Lys	Lys	Tyr	Phe	Gln	Arg	Ile	Thr	
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ctt tat ctg aca gag aag aaa tac agc cct tgt gcc tgg gag gtt gtc															432	
Leu	Tyr	Leu	Thr	Glu	Lys	Lys	Tyr	Ser	Pro	Cys	Ala	Trp	Glu	Val	Val	
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aga gca gaa atc atg aga tcc ttc tct tta tca aaa att ttt caa gaa															480	
Arg	Ala	Glu	Ile	Met	Arg	Ser	Phe	Ser	Leu	Ser	Lys	Ile	Phe	Gln	Glu	
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Ala																
Gln																
Met																
Gly																
Arg																
Ile																
Ser																
Pro																
Phe																
Ser																
Cys																
Leu																
Lys																
Asp																
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Gln																
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Thr																
Trp																
Glu																
Gln																
Ser																
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Lys																
Ala																
Gln																
Ala																
Ile																
Pro																
Val																
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Met																
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Phe																
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Ser																
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Ala																
Thr																
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Glu																
Gln																
Ser																
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Glu																
Lys																
Phe																
Ser																
Thr																
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Leu																
Asn																
Gln																
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Asn																
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Ala																
Cys																
Val																
Ile																
Gln																
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Met																
Ile																
Gln																
Glu																
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Leu																
Ala																
Val																
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Phe																
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Thr																
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Tyr																
Ser																
Pro																
Cys																
Ala																
Trp																
Glu																
Val																
Val																
130																140
Arg																
Ala																
Glu																
Ile																
Met																
Arg																
Ser																
Phe																
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Leu																
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Lys																
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cct gaa ctc ctg ggg gga ccg tca gtc ttc ctc ttc c		aaa ccc	96
Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe P		Lys Pro	
20 25			
aag gac acc ctc atg atc tcc cgg acc cct gag gtc a		gtg gtg	144
Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val T		Val Val	
35 40			
gtg gac gtg agc cac gaa gac cct gag gtc aag ttc a		tac gtg	192
Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe A		Tyr Val	
50 55 60			
gac ggc gtg gag gtg cat aat gcc aag aca aag ccg c		gag cag	240
Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro I		Glu Gln	
65 70 75		80	
tac aac agc acg tac cgt gtg gtc agc gtc ctc acc c		cac cag	288
Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr V		His Gln	
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gac tgg ctg aat ggc aag gag tac aag tgc aag gtc t		aaa gcc	336
Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val S		Lys Ala	
100 105			
ctc cca gcc ccc atc gag aaa acc atc tcc aaa gcc a		cag ccc	384
Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala I		Gln Pro	
115 120			
cga gaa cca cag gtg tac acc ctg ccc cca tca cgg c		atg acc	432
Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg C		Met Thr	
130 135 140			
aag aac cag gtc agc ctg acc tgc ctg gtc aaa ggc t		ccc agc	480
Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly I		Pro Ser	
145 150 155		160	
gac atc gcc gtg gag tgg gag agc aat ggg cag ccg c		aac tac	528
Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro C		Asn Tyr	
165 170		175	

aag acc acg cct ccc gtg ctg gac tcc gac ggc tcc ttc ttc ctc tat 576
Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr
180 185 190

agc aag ctc acc gtg gac aag agc agg tgg cag cag ggg aac gtc ttc 624
Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe
195 200 205

tca tgc tcc gtg atg cat gag gct ctg cac aac cac tac acg cag aag 672
Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys
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agc ctc tcc ctg tcc ccg ggt aaa 696
Ser Leu Ser Leu Ser Pro Gly Lys
225 230

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Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro
20 25 30

Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
35 40 45

Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val
50 55 60

Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
65 70 75 80

Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln
85 90 95

Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
100 105 110

Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro
115 120 125

Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr
130 135 140

Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser
145 150 155 160

Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr
165 170 175

Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr
180 185 190

Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe
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Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys
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Ser Leu Ser Leu Ser Pro Gly Lys
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ctcgagtcaa tccttcctcc ttaatc 26

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<223> IFN alpha consensus sequence wherein, Xaa at any position besides positions 24, 31, 70 and 129 represents any amino acid.

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<223> Xaa24 can be Ile or Leu, Xaa31 can be Lys or Gln, Xaa70 can be Thr or Ser and Xaa 129 can be Leu or Val.

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1 5 10 15

Xaa Xaa Xaa Xaa Met Xaa Xaa Xaa Ser Pro Xaa Xaa Cys Leu Xaa Xaa
20 25 30

Arg Xaa Asp Phe Xaa Xaa Pro Xaa Glu Xaa Xaa Xaa Xaa Gln Xaa

35

40

45

Xaa Xaa Xaa Gln Ala Xaa Xaa Val Leu Xaa Xaa Xaa Gln Gln Xaa
50 55 60

Xaa Xaa Leu Phe Xaa Xaa Xaa Xaa Ser Ala Xaa Trp Xaa Xaa Thr
65 70 75 80

Leu Leu Xaa Xaa Xaa Xaa Xaa Leu Xaa Gln Gln Leu Xaa Asp Leu
85 90 95

Xaa Xaa Cys Xaa Leu Xaa
100 105 110

Xaa Val Xaa Xaa Xaa Leu Xaa Val Xaa Xaa Tyr Phe Xaa Xaa Ile Xaa
115 120 125

Xaa Tyr Leu Xaa Xaa Lys Xaa Xaa Ser Xaa Cys Ala Trp Glu Xaa Xaa
130 135 140

Xaa Xaa Xaa Xaa Met Arg Xaa Xaa Ser Xaa Xaa Xaa Xaa Leu Xaa Xaa
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Arg Leu

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<223> Human IFN alpha-1 protein

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Leu Leu Ala Gln Met Ser Arg Ile Ser Pro Ser Ser Cys Leu Met Asp
20 25 30 .

Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
35 40 45

Gln Lys Ala Pro Ala Ile Ser Val Leu His Glu Leu Ile Gln Gln Ile
50 55 60

Phe Asn Leu Phe Thr Thr Lys Asp Ser Ser Ala Ala Trp Asp Glu Asp
65 70 75 80

Leu Leu Asp Lys Phe Cys Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Val Met Gln Glu Glu Arg Val Gly Glu Thr Pro Leu Met
100 105 110

Asn Ala Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Arg Arg Ile Thr
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Leu Ser Thr Asn Leu Gln Glu
145 150 155 160

Arg Leu Arg Arg Lys Glu
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<210> 9
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<212> PRT
<213> Homo sapiens

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Leu Leu Ala Gln Met Arg Lys Ile Ser Leu Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Gly Asn Gln Phe Gln
35 40 45

Lys Ala Glu Thr Ile Pro Val Leu His Glu Met Ile Gln Gln Ile Phe
50 55 60

Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ala Trp Asp Glu Thr Leu
65 70 75 80

Leu Asp Lys Phe Tyr Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu Glu
85 90 95

Ala Cys Val Ile Gln Gly Val Gly Val Thr Glu Thr Pro Leu Met Lys
100 105 110

Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr Leu
115 120 125

Tyr Leu Lys Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val Arg
130 135 140

Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Thr Asn Leu Gln Glu Ser
145 150 155 160

Leu Arg Ser Lys Glu
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<211> 166
<212> PRT
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Leu Leu Ala Gln Met Gly Arg Ile Ser His Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Asp Phe Gly Phe Pro Glu Glu Glu Phe Asp Gly His Gln Phe
35 40 45

Gln Lys Thr Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser
65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met
100 105 110

Asn Val Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys
145 150 155 160

Arg Leu Arg Arg Lys Asp
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<223> Human IFN alpha-5 protein

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Ile Met Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
35 40 45

Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Thr Trp Asp Glu Thr
65 70 75 80

Leu Leu Asp Lys Phe Tyr Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Met Met Gln Glu Val Gly Val Glu Asp Thr Pro Leu Met
100 105 110

Asn Val Asp Ser Ile Leu Thr Val Arg Lys Tyr Phe Gln Arg Ile Thr
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Ala Asn Leu Gln Glu
145 150 155 160

Arg Leu Arg Arg Lys Glu
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Cys Asp Leu Pro Gln Thr His Ser Leu Gly His Arg Arg Thr Met Met
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Leu Leu Ala Gln Met Arg Arg Ile Ser Leu Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Asp Phe Arg Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
35 40 45

Gln Lys Ala Glu Ala Ile Ser Val Leu His Glu Val Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Val Ala Trp Asp Glu Arg
65 70 75 80

Leu Leu Asp Lys Leu Tyr Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Val Met Gln Glu Val Trp Val Gly Gly Thr Pro Leu Met
100 105 110

Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr
115 120 125
Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140
Arg Ala Glu Ile Met Arg Ser Phe Ser Ser Ser Arg Asn Leu Gln Glu
145 150 155 160
Arg Leu Arg Arg Lys Glu
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<212> PRT
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Cys Asp Leu Pro Gln Thr His Ser Leu Arg Asn Arg Arg Ala Leu Ile
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Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Glu Phe Arg Phe Pro Glu Glu Glu Phe Asp Gly His Gln Phe
35 40 45

Gln Lys Thr Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser
65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met
100 105 110

Asn Glu Asp Phe Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr
115 120 125

Leu Tyr Leu Met Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Phe Ser Thr Asn Leu Lys Lys
145 150 155 160

Gly Leu Arg Arg Lys Asp
165

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Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile
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Leu Leu Ala Gln Met Arg Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Asp Phe Glu Phe Pro Gln Glu Glu Phe Asp Asp Lys Gln Phe
35 40 45

Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ala Leu Asp Glu Thr
65 70 75 80

Leu Leu Asp Glu Phe Tyr Ile Glu Leu Asp Gln Gln Leu Asn Asp Leu
85 90 95

Glu Val Leu Cys Asp Gln Glu Val Gly Val Ile Glu Ser Pro Leu Met
100 105 110

Tyr Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Ser Cys Ala Trp Glu Val Val
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Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Ile Asn Leu Gln Lys
145 150 155 160

Arg Leu Lys Ser Lys Glu
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Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile
1 5 10 15

Leu Leu Gly Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
20 25 30

Arg His Asp Phe Arg Ile Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
 35 40 45

 Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr
 50 55 60

 Phe Asn Leu Phe Ser Thr Glu Asp Ser Ser Ala Ala Trp Glu Gln Ser
 65 70 75 80

 Leu Leu Glu Lys Phe Ser Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
 85 90 95

 Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met
 100 105 110

 Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr
 115 120 125

 Leu Tyr Leu Ile Glu Arg Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
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 Arg Ala Glu Ile Met Arg Ser Leu Ser Phe Ser Thr Asn Leu Gln Lys
 145 150 155 160

 Arg Leu Arg Arg Lys Asp
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 Cys Leu Lys Asp Arg His Asp Phe Glu Phe Pro Gln Glu Glu Phe Asp
 35 40 45

 Gly Asn Gln Phe Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met
 50 55 60

 Met Gln Gln Thr Phe Asn Leu Phe Ser Thr Lys Asn Ser Ser Ala Ala
 65 70 75 80

 Trp Asp Glu Thr Leu Leu Glu Lys Phe Tyr Ile Glu Leu Phe Gln Gln
 85 90 95

 Met Asn Asp Leu Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu



100

105

110

Thr Pro Leu Met Asn Glu Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe
115 120 125

Gln Arg Ile Thr Leu Tyr Leu Met Glu Lys Lys Tyr Ser Pro Cys Ala
130 135 140

Trp Glu Val Val Arg Ala Glu Ile Met Arg Ser Phe Ser Phe Ser Thr
145 150 155 160

Asn Leu Gln Lys Arg Leu Arg Arg Lys Asp
165 170

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Leu Leu Ala Gln Met Gly Arg Ile Ser His Phe Ser Cys Leu Lys Asp
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Arg Tyr Asp Phe Gly Phe Pro Gln Glu Val Phe Asp Gly Asn Gln Phe
35 40 45

Gln Lys Ala Gln Ala Ile Ser Ala Phe His Glu Met Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Ala Trp Asp Glu Thr
65 70 75 80

Leu Leu Asp Lys Phe Tyr Ile Glu Leu Phe Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Val Thr Gln Glu Val Gly Val Glu Glu Ile Ala Leu Met
100 105 110

Asn Glu Asp Ser Ile Leu Ala Val Arg Lys Tyr Phe Gln Arg Ile Thr
115 120 125

Leu Tyr Leu Met Gly Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Phe Ser Thr Asn Leu Gln Lys
145 150 155 160

Gly Leu Arg Arg Lys Asp
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Leu	Leu	Ala	Gln	Met	Gly	Arg	Ile	Ser	Pro	Phe	Ser	Cys	Leu	Lys	Asp
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Arg	His	Asp	Phe	Gly	Leu	Pro	Gln	Glu	Glu	Phe	Asp	Gly	Asn	Gln	Phe
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Gln	Lys	Thr	Gln	Ala	Ile	Ser	Val	Leu	His	Glu	Met	Ile	Gln	Gln	Thr
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Phe	Asn	Leu	Phe	Ser	Thr	Glu	Asp	Ser	Ser	Ala	Ala	Trp	Glu	Gln	Ser
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Leu	Leu	Glu	Lys	Phe	Ser	Thr	Glu	Leu	Tyr	Gln	Gln	Leu	Asn	Asn	Leu
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Glu	Ala	Cys	Val	Ile	Gln	Glu	Val	Gly	Met	Glu	Glu	Thr	Pro	Leu	Met
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Asn	Glu	Asp	Ser	Ile	Leu	Ala	Val	Arg	Lys	Tyr	Phe	Gln	Arg	Ile	Thr
					115			120				125			
Leu	Tyr	Leu	Thr	Glu	Lys	Lys	Tyr	Ser	Pro	Cys	Ala	Trp	Glu	Val	Val
					130			135				140			
Arg	Ala	Glu	Ile	Met	Arg	Ser	Leu	Ser	Phe	Ser	Thr	Asn	Leu	Gln	Lys
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Ile	Leu	Arg	Arg	Lys	Asp								*	-	
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<210> 19
<211> 166
<212> PRT
<213> Homo sapiens

<220>
<223> Human IFN alpha-21 protein

<400> 19

Cys	Asp	Leu	Pro	Gln	Thr	His	Ser	Leu	Gly	Asn	Arg	Arg	Ala	Leu	Ile
1								10						15	
Leu	Leu	Ala	Gln	Met	Gly	Arg	Ile	Ser	Pro	Phe	Ser	Cys	Leu	Lys	Asp

20 25 30

Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
35 40 45

Gln Lys Ala Gln Ala Ile Ser Val Leu His Glu Met Ile Gln Gln Thr
50 55 60

Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Thr Trp Glu Gln Ser
65 70 75 80

Leu Leu Glu Lys Phe Ser Thr Glu Leu Asn Gln Gln Leu Asn Asp Leu
85 90 95

Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met
100 105 110

Asn Val Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Gln Arg Ile Thr
115 120 125

Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Lys Ile Phe Gln Glu
145 150 155 160

Arg Leu Arg Arg Lys Glu
165

<210> 20

<211> 172

<212> PRT

<213> Homo sapiens

<220>

<223> Human IFN delta-1 protein

<400> 20

Cys Asp Leu Ser Gln Asn His Val Leu Val Gly Arg Lys Asn Leu Arg
1 5 10 15

Leu Leu Asp Glu Met Arg Arg Leu Ser Pro His Phe Cys Leu Gln Asp
20 25 30

Arg Lys Asp Phe Ala Leu Pro Gln Glu Met Val Glu Gly Gly Gln Leu
35 40 45

Gln Glu Ala Gln Ala Ile Ser Val Leu His Glu Met Leu Gln Gln Ser
50 55 60

Phe Asn Leu Phe His Thr Glu His Ser Ser Ala Ala Trp Asp Thr Thr
65 70 75 80

Leu Leu Glu Pro Cys Arg Thr Gly Leu His Gln Gln Leu Asp Asn Leu
85 90 95

Asp Ala Cys Leu Gly Gln Val Met Gly Glu Glu Asp Ser Ala Leu Gly
100 105 110
Arg Thr Gly Pro Thr Leu Ala Leu Lys Arg Tyr Phe Gln Gly Ile His
115 120 125
Val Tyr Leu Lys Glu Lys Gly Tyr Ser Asp Cys Ala Trp Glu Thr Val
130 135 140
Arg Leu Glu Ile Met Arg Ser Phe Ser Ser Leu Ile Ser Leu Gln Glu
145 150 155 160
Arg Leu Arg Met Met Asp Gly Asp Leu Ser Ser Pro
165 170

<210> 21
<211> 172
<212> PRT
<213> Homo sapiens

<220>
<223> Human IFN omega-1 protein

<400> 21
Cys Asp Leu Pro Gln Asn His Gly Leu Leu Ser Arg Asn Thr Leu Val
1 5 10 15

Leu Leu His Gln Met Arg Arg Ile Ser Pro Phe Leu Cys Leu Lys Asp
20 25 30

Arg Arg Asp Phe Arg Phe Pro Gln Glu Met Val Lys Gly Ser Gln Leu
35 40 45

Gln Lys Ala His Val Met Ser Val Leu His Glu Met Leu Gln Gln Ile
50 55 60

Phe Ser Leu Phe His Thr Glu Arg Ser Ser Ala Ala Trp Asn Met Thr
65 70 75 80

Leu Leu Asp Gln Leu His Thr Gly Leu His Gln Gln Leu Gln His Leu
85 90 95

Glu Thr Cys Leu Leu Gln Val Val Gly Glu Gly Glu Ser Ala Gly Ala
100 105 110

Ile Ser Ser Pro Ala Leu Thr Leu Arg Arg Tyr Phe Gln Gly Ile Arg
115 120 125

Val Tyr Leu Lys Glu Lys Lys Tyr Ser Asp Cys Ala Trp Glu Val Val
130 135 140

Arg Met Glu Ile Met Lys Ser Leu Phe Leu Ser Thr Asn Met Gln Glu
145 150 155 160

Arg Leu Arg Ser Lys Asp Arg Asp Leu Gly Ser Ser
165 170

<210> 22
<211> 166
<212> PRT
<213> Mus musculus

<220>
<223> Mouse IFN alpha-1 protein

<400> 22
Cys Asp Leu Pro Gln Thr His Asn Leu Arg Asn Lys Arg Ala Leu Thr
1 5 10 15

Leu Leu Val Gln Met Arg Arg Leu Ser Pro Leu Ser Cys Leu Lys Asp
20 25 30

Arg Lys Asp Phe Gly Phe Pro Gln Glu Lys Val Asp Ala Gln Gln Ile
35 40 45

Lys Lys Ala Gln Ala Ile Pro Val Leu Ser Glu Leu Thr Gln Gln Ile
50 55 60

Leu Asn Ile Phe Thr Ser Lys Asp Ser Ser Ala Ala Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Phe Cys Asn Asp Leu His Gln Gln Leu Asn Asp Leu
85 90 95

Gln Gly Cys Leu Met Gln Gln Val Gly Val Gln Glu Phe Pro Leu Thr
100 105 110

Gln Glu Asp Ala Leu Leu Ala Val Arg Lys Tyr Phe His Arg Ile Thr
115 120 125

Val Tyr Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Val Trp Arg Ala Leu Ser Ser Ser Ala Asn Val Leu Gly
145 150 155 160

Arg Leu Arg Glu Glu Lys
165

<210> 23
<211> 167
<212> PRT
<213> Mus musculus

<220>
<223> Mouse IFN alpha-2 protein

<400> 23
Cys Asp Leu Pro His Thr Tyr Asn Leu Arg Asn Lys Arg Ala Leu Lys
1 5 10 15

Val Leu Ala Gln Met Arg Arg Leu Pro Phe Leu Ser Cys Leu Lys Asp
20 25 30

Arg Gln Asp Phe Gly Phe Pro Leu Glu Lys Val Asp Asn Gln Gln Ile
35 40 45

Gln Lys Ala Gln Ala Ile Pro Val Leu Arg Asp Leu Thr Gln Gln Thr
50 55 60

Leu Asn Leu Phe Thr Ser Lys Ala Ser Ser Ala Ala Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Phe Cys Asn Asp Leu His Gln Gln Leu Asn Asp Leu
85 90 95

Gln Thr Cys Leu Met Gln Gln Val Gly Val Gln Glu Pro Pro Leu Thr
100 105 110

Gln Glu Asp Ala Leu Leu Ala Val Arg Lys Tyr Phe His Arg Ile Thr
115 120 125

Val Tyr Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Val Trp Arg Ala Leu Ser Ser Ser Val Asn Leu Leu Pro
145 150 155 160

Arg Leu Ser Glu Glu Lys Glu
165

<210> 24

<211> 162

<212> PRT

<213> Mus musculus

<220>

<223> Mouse IFN alpha-4 protein

<400> 24

Cys Asp Leu Pro His Thr Tyr Asn Leu Gly Asn Lys Arg Ala Leu Thr
1 5 10 15

Val Leu Glu Glu Met Arg Arg Leu Pro Pro Leu Ser Cys Leu Lys Asp
20 25 30

Arg Lys Asp Phe Gly Phe Pro Leu Glu Lys Val Asp Asn Gln Gln Ile
35 40 45

Gln Lys Ala Gln Ala Ile Leu Val Leu Arg Asp Leu Thr Gln Gln Ile
50 55 60

Leu Asn Leu Phe Thr Ser Lys Asp Leu Ser Ala Thr Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Phe Cys Asn Asp Leu His Gln Gln Leu Asn Asp Leu
85 90 95

Lys Ala Cys Val Met Gln Glu Pro Pro Leu Thr Gln Glu Asp Ser Leu
100 105 110

Leu Ala Val Arg Thr Tyr Phe His Arg Ile Thr Val Tyr Leu Arg Lys
115 120 125

Lys Lys His Ser Leu Cys Ala Trp Glu Val Ile Arg Ala Glu Val Trp
130 135 140

Arg Ala Leu Ser Ser Ser Thr Asn Leu Leu Ala Arg Leu Ser Glu Glu
145 150 155 160

Lys Glu

<210> 25

<211> 166

<212> PRT

<213> Mus musculus

<220>

<223> Mouse IFN alpha-5 protein

<400> 25

Cys Asp Leu Leu Gln Thr His Asn Leu Arg Asn Lys Arg Ala Leu Thr
1 5 10 15

Leu Leu Val Lys Met Arg Arg Leu Ser Pro Leu Ser Cys Leu Lys Asp
20 25 30

Arg Lys Asp Phe Gly Phe Pro Gln Glu Lys Val Gly Ala Gln Gln Ile
35 40 45

Gln Glu Ala Gln Ala Ile Pro Val Leu Ser Glu Leu Thr Gln Gln Val
50 55 60

Leu Asn Ile Phe Thr Ser Lys Asp Ser Ser Ala Ala Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Phe Cys Asn Glu Val His Gln Gln Leu Asn Asp Leu
85 90 95

Lys Ala Cys Val Met Gln Gln Val Gly Val Gln Glu Ser Pro Leu Thr
100 105 110

Gln Glu Asp Ser Leu Leu Ala Val Arg Lys Tyr Phe His Arg Ile Thr
115 120 125

Val Tyr Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Val Trp Arg Ala Leu Ser Ser Ser Val Asn Leu Leu Ala
145 150 155 160

Arg Leu Ser Lys Glu Glu

<210> 26
 <211> 166
 <212> PRT
 <213> Mus musculus

<220>
 <223> Mouse IFN alpha-6 protein

<400> 26
 Cys Asp Leu Pro Gln Thr His Asn Leu Arg Asn Lys Arg Ala Leu Thr
 1 5 10 15
 Leu Leu Val Lys Met Arg Arg Leu Ser Pro Leu Ser Cys Leu Lys Asp
 20 25 30
 Arg Lys Asp Phe Gly Phe Pro Gln Glu Lys Val Gly Ala Gln Gln Ile
 35 40 45
 Gln Glu Ala Gln Ala Ile Pro Val Leu Thr Glu Leu Thr Gln Gln Ile
 50 55 60
 Leu Thr Leu Phe Thr Ser Lys Asp Ser Ser Ala Ala Trp Asn Ala Thr
 65 70 75 80
 Leu Leu Asp Ser Phe Cys Asn Asp Leu His Gln Leu Leu Asn Asp Leu
 85 90 95
 Gln Gly Cys Leu Met Gln Gln Val Glu Ile Gln Ala Leu Pro Leu Thr
 100 105 110
 Gln Glu Asp Ser Leu Leu Ala Val Arg Thr Tyr Phe His Arg Ile Thr
 115 120 125
 Val Phe Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
 130 135 140
 Arg Ala Glu Val Trp Arg Ala Leu Ser Ser Ala Lys Leu Leu Ala
 145 150 155 160
 Arg Leu Asn Glu Asp Glu
 165

<210> 27
 <211> 167
 <212> PRT
 <213> Mus musculus

<220>
 <223> Mouse IFN alpha-7 protein

<400> 27
 Cys Asp Leu Pro Gln Thr His Asn Leu Arg Asn Lys Arg Ala Leu Thr
 1 5 10 15

Leu Leu Val Lys Met Arg Arg Leu Ser Pro Leu Ser Cys Leu Lys Asp
20 25 30

Arg Lys Asp Phe Gly Phe Pro Gln Ala Lys Val Asp Ala Gln Gln Ile
35 40 45

Gln Glu Ala Gln Ala Ile Pro Val Leu Ser Glu Leu Thr Gln Gln Ile
50 55 60

Leu Asn Ile Phe Thr Ser Lys Asp Ser Ser Ala Ala Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Val Cys Asn Asp Leu His Gln Gln Leu Asn Asp Leu
85 90 95

Gln Gly Cys Leu Met Gln Glu Val Gly Val Gln Glu Leu Ser Leu Thr
100 105 110

Gln Glu Asp Ser Leu Leu Ala Val Arg Lys Tyr Phe His Arg Ile Thr
115 120 125

Val Phe Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Ile Trp Arg Ala Leu Ser Ser Ser Ala Asn Leu Leu Ala
145 150 155 160

Arg Leu Ser Glu Lys Lys Glu
165

<210> 28
<211> 166
<212> PRT
<213> *Mus musculus*

<220>
<223> *Mouse IFN alpha-8 protein*

<400> 28
Cys Asp Leu Pro Gln Thr His Asn Leu Arg Asn Lys Arg Ala Leu Thr
1 5 10 15

Leu Leu Val Lys Met Arg Arg Leu Ser Pro Leu Ser Cys Leu Lys Asp
20 25 30

Arg Lys Asp Phe Gly Phe Pro Gln Glu Lys Val Gly Ala Gln Gln Ile
35 40 45

Gln Glu Ala Gln Ala Ile Pro Val Leu Thr Glu Leu Thr Gln Gln Ile
50 55 60

Leu Ala Leu Phe Thr Ser Lys Asp Ser Ser Ala Ala Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Phe Cys Asn Asp Leu His Gln Leu Leu Asn Asp Leu



85

90

95

Gln Gly Cys Leu Met Gln Gln Val Glu Ile Gln Ala Leu Pro Leu Thr
100 105 110

Gln Glu Asp Ser Leu Leu Ala Val Arg Thr Tyr Phe His Arg Ile Thr
115 120 125

Val Phe Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Val Trp Arg Ala Leu Ser Ser Ala Lys Leu Leu Ala
145 150 155 160

Arg Leu Asn Glu Asp Glu
165

<210> 29

<211> 167

<212> PRT

<213> Mus musculus

<220>

<223> Mouse IFN alpha-9 protein

<400> 29

Cys Asp Leu Pro Gln Thr His Asn Leu Arg Asn Lys Lys Ile Leu Thr
1 5 10 15

Leu Leu Ala Gln Met Arg Arg Leu Ser Pro Leu Ser Cys Leu Lys Asp
20 25 30

Arg Lys Asp Phe Gly Phe Pro Gln Glu Lys Val Asp Ala Gln Gln Ile
35 40 45

Gln Glu Ala Gln Ala Ile Pro Val Leu Ser Glu Leu Thr Gln Gln Ile
50 55 60

Leu Thr Leu Phe Thr Ser Lys Asp Ser Ser Ala Ala Trp Asn Ala Thr
65 70 75 80

Leu Leu Asp Ser Phe Cys Thr Gly Leu His Gln Leu Leu Asn Asp Leu
85 90 95

Gln Gly Cys Leu Met Gln Leu Val Gly Met Lys Glu Leu Pro Leu Thr
100 105 110

Gln Glu Asp Ser Gln Leu Ala Met Lys Lys Tyr Phe His Arg Ile Thr
115 120 125

Val Tyr Leu Arg Glu Lys Lys His Ser Pro Cys Ala Trp Glu Val Val
130 135 140

Arg Ala Glu Val Trp Arg Ala Leu Ser Ser Val Asn Leu Leu Ala
145 150 155 160

Arg Leu Ser Glu Glu Lys Glu
165

Arg Leu Ser Glu Glu Lys Glu